

FOURTH BORE

PROJECT UPDATE FALL 2012



CONTRA COSTA
transportation
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PROJECT INTRODUCTION

The Caldecott Fourth Bore Project represents a partnership between the Federal Highway Administration, the California Department of Transportation, the Metropolitan Transportation Commission, the Contra Costa Transportation Authority, and the Alameda County Transportation Commission to build a two-lane fourth bore north of the existing three Caldecott tunnels. When it opens to traffic in late 2013, it will provide congestion relief along a heavily traveled portion of State Route 24 between Alameda and Contra Costa counties.



Workers perch on a gantry to hand-tie the rebar cage supporting the final lining.

Since the start of Fourth Bore construction almost two years ago, hundreds of workers have contributed to the excavation of the tunnel, which was completed in late September. Since the topheading, or upper portion, of the tunnel “broke through” in November 2011, crews worked around the clock to finish mining. Almost 210,000 cubic meters of dirt and rock were removed. With digging complete, work is shifting from excavation to final concrete work, and the 130-ton roadheader boring machine has been retired.

THE ROAD AHEAD

Even before excavation was completed, work began on the elements that will transform a big hole into an operating tunnel. Working from west to east, crews have been installing a rebar cage to provide structural stability, over which they will apply a smooth concrete arch to provide flexibility. A roadway and the operational systems, including electrical, ventilation, and drainage, will be installed before the Fourth Bore opens to traffic.

Excavation of an invert, which is a trench filled with concrete and rebar, has improved rock stability in an environment of weaker rock on the west side, and swelling caused by groundwater on the east side. Seven cross passages, or safety paths, between the third and fourth bores have been excavated and are being connected.

The completion of tunnel excavation is a major milestone. The Fourth Bore continues to be on target for opening in late 2013, bringing traffic congestion relief to motorists travelling in the off-peak direction.

FOR MORE INFORMATION

Community outreach to neighbors, community, and civic groups in Alameda and Contra Costa counties is important. For more information please visit:

WEBSITE: www.Caldecott-Tunnel.org

E-MAIL: Ivy_Morrison@dot.ca.gov

Photos clockwise from top left: cross passages between the Third and Fourth Bores are connected; a worker uses a busching hammer to clean debris from concrete; workers apply shotcrete below the invert near the eastern portal.

FACTS

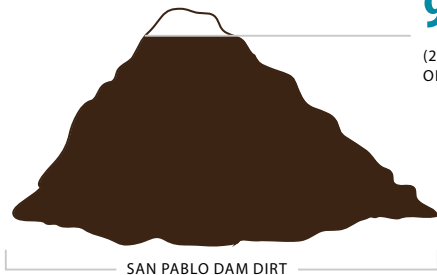
Groundbreaking: January 2010

Bore Open to Traffic: Late 2013

Anticipated Completion: 2014

Total Funding: \$402 million

Traffic Lanes: Two 12-foot traffic lanes with two shoulders – 10 feet on the northern wall and two feet on the southern wall

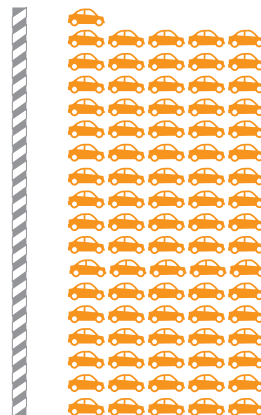


91%

(210,000m³) VOLUME OF DIRT EXCAVATED

Volume of Dirt Excavated:

With primary tunneling complete, 210,000 cubic meters of dirt have been excavated from the East Bay Hills. That's equal to 91% of the volume of Contra Costa's earthen San Pablo Dam, which is made up of 230,000 cubic meters of earth.



1.6 = 1956

MILLION KG OF STEEL REBAR

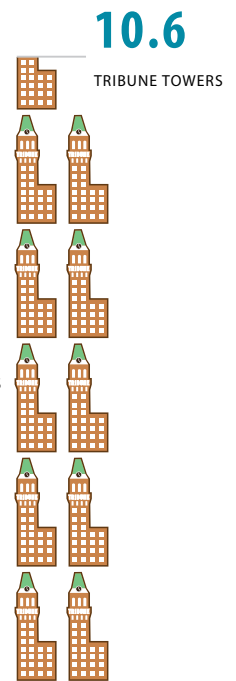
CARS (1=818.2 KG OF STEEL)

Mass of Steel Rebar:

When buttressing is complete, there will be 1.6 million kilograms of steel rebar in the Fourth Bore. That's enough steel to make 1956 average American cars.

990

LINEAR METERS EXCAVATED



Linear meters excavated:

The length of the Fourth Bore, 990 meters, is more than ten times the height of downtown Oakland's landmark Tribune Tower, at 93 meters.

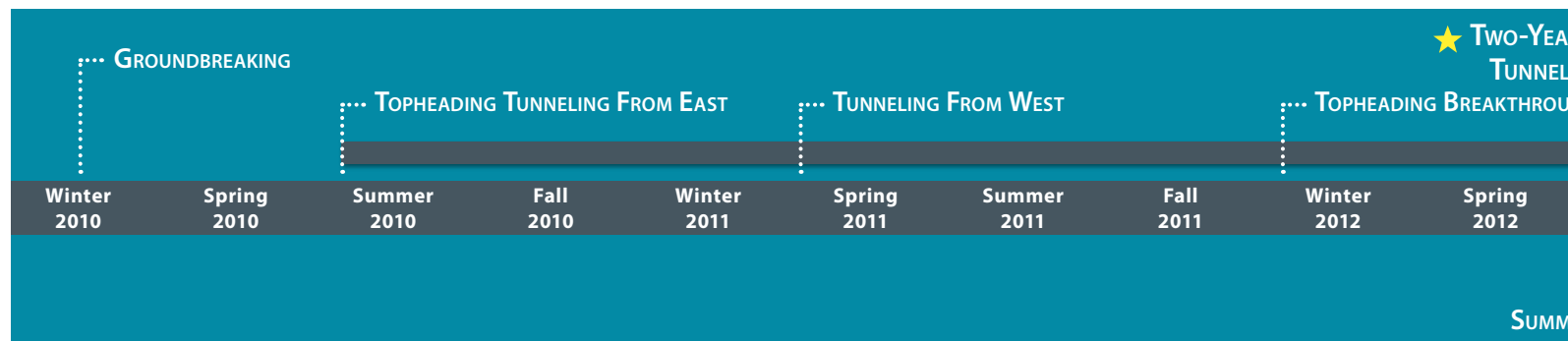
PROJECT OVERVIEW

The Caldecott Fourth Bore Project is composed of four separate contracts. In addition to the construction of the Fourth Bore itself, there are two smaller projects to enhance traffic flow in the vicinity of the tunnels, which have now been completed. A project to landscape the area after the tunnel is completed will begin its design phase in late 2012.

In addition, the project includes the following elements:

- Construction of retaining walls and portals at the new tunnel openings
- Temporary and permanent soundwalls on the west side
- Seven emergency cross passages between the third and fourth bores
- Demolition of the existing maintenance building and construction of a new two-story operations and maintenance building
- Installation of operations, communications and emergency systems
- Various roadway improvements

PROJECT TIMELINE



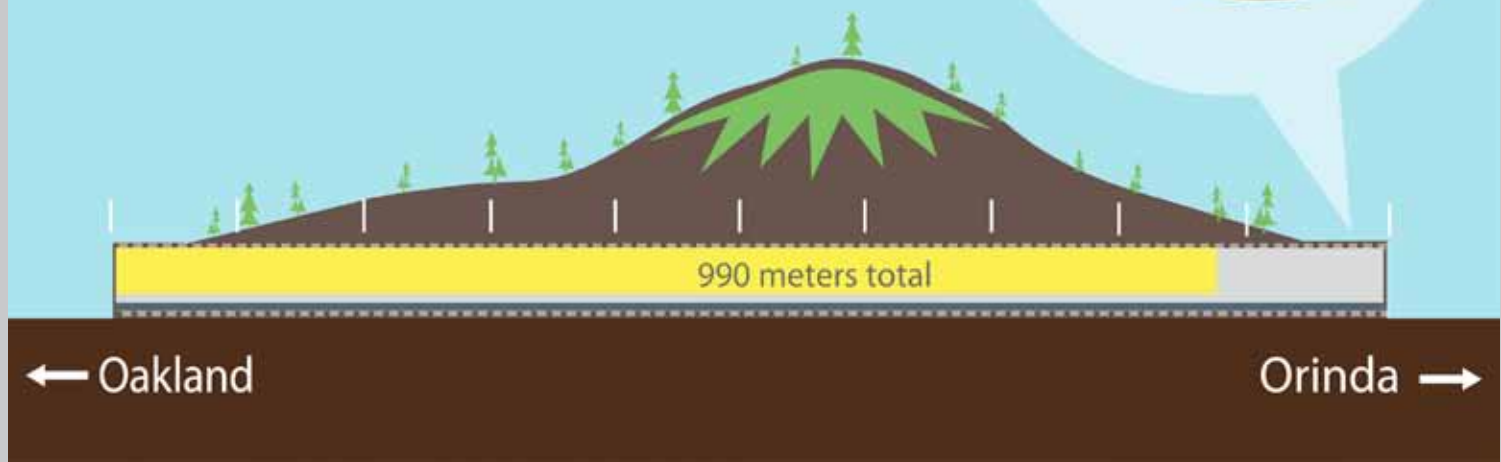
CONGESTION RELIEF

State Route 24 currently carries about 160,000 vehicles a day through the three existing tunnels. Traffic congestion is an ongoing problem.

The new Fourth Bore will relieve congestion in the off-peak direction by permanently dedicating two bores to westbound traffic and two to eastbound traffic.

This will eliminate the need to reverse traffic direction in the center bore twice a day to accommodate morning and evening commute traffic, and add greater predictability on weekends.





TUNNELING THROUGH TIME – GEOLOGY OF THE FOURTH BORE



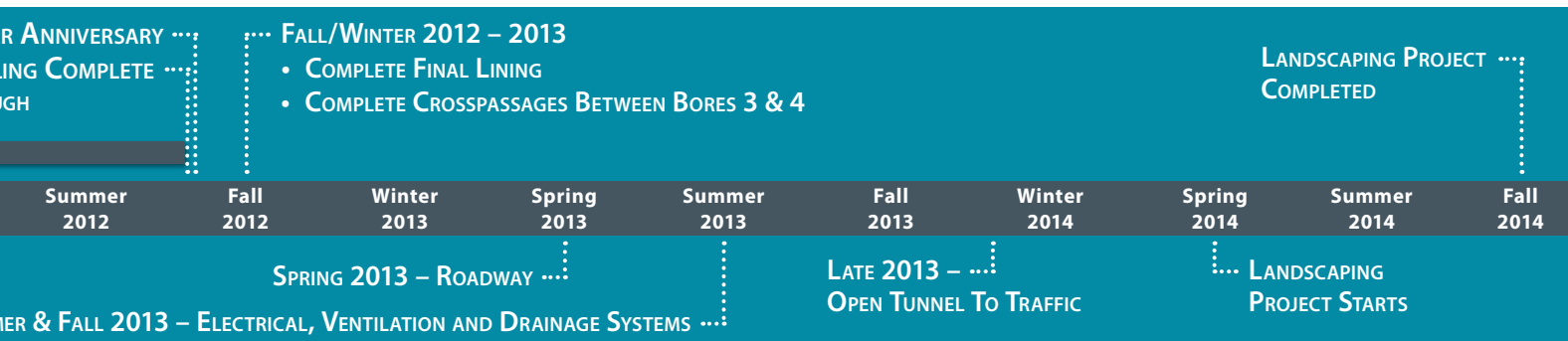
Boring a tunnel through dirt and rock requires a keen understanding of geology. Due to seismic activity, the rock deposits that make up the East Bay Hills have shifted from horizontal to vertical layers, as if toppled over. As mining of the Caldecott Fourth Bore progresses through the hills, workers traverse rocks formed in different time periods, with the oldest found on the west side of the hills, and the youngest on the east.

"The rocks that we are mining span almost eight million years of geology in a mile. That history tells a story of the West Bay Hills," said Caltrans Engineering

Geologist, Chris Ridsen. Chris's role on the Fourth Bore project included detailed mapping of the interior of the hills to ensure that the tunnel's construction methods were most appropriate to the relative strength or weakness of the surrounding rock.

With primary tunneling complete, excavation continues on an invert, or trench, beneath the tunnel, filled with concrete and rebar, which will provide additional stability in an environment of weaker rock on the west side, and swelling caused by groundwater on the east side. The changing conditions throughout the hills reflect the geologic forces that formed them.

As Ridsen explained, “For every earthquake, a little bit of rock gets displaced. Build up enough of these small displacements over a very, very, very long time, and rocks can move great distances. This is exactly how these rocks, from different places and ages, came together here in the East Bay hills.”



CALDECOTT FOURTH BORE MEDALLION COMPETITION WINNERS ANNOUNCED

In late June, judging panelists in Alameda and Contra Costa counties faced the daunting task of whittling down the hundreds of outstanding Medallion Competition entries to just six. The selected designs, created by local students, will be translated into concrete and installed at each end of the tunnel, in accordance with the tunnel's design plans.

The public chose the theme of the competition, "Art Deco Revisited," in homage to the design style of the medallions that adorn the 1937 tunnels.

The competition was open to school-aged kids in both counties. After an online screening, the selections were made by judges with expertise in art and local history, including a representative of the Art Deco Society, and the University of California Director of Architecture.

The Fourth Bore Project recently announced the winners. From Alameda County, they are: Eight-year-old Nuala Gorshow, 11-year-old Aoife Gorshow and 10-year-old Ellina Bartholomew Coutts. In Contra Costa County, judges selected designs created by eight-year-old Chaya Tong, 13-year-old Penelope Watson, and 16-year-old Daniell McCann.

Celebrations for competition participants are being planned in Alameda and Contra Costa counties for this fall.

Thank you to the many students, parents and teachers who supported this creative effort!

Medallion by
Henry Meyers, 1937



Medallion Design by
Aoife Gorshow, 2012



To view all of the selected designs, as well as the many honorable mentions, please visit www.Caldecott-Tunnel.org/Medallion

TUNNELING ROCK STARS BID 'AUF WIEDERSEHEN'



From left, Bhaskar Thapa, Ivan Ramirez, and Axel Nitschke.

With excavation complete, several key tunnel engineers will be leaving the Fourth Bore Project. They are: Caltrans Senior Engineer Ivan Ramirez, who was in charge of the project's Sequential Excavation Method (SEM) team. SEM required tunnel workers to tailor the length of each round of excavation and the amount of structural support that was installed to the immediate ground conditions. Ramirez, who worked on the Devil's Slide Project in Pacifica, was well acquainted with this method when he joined the Fourth Bore Project.

Working closely with Ramirez were Bhaskar Thapa, PhD and Axel Nitschke, PhD. Thapa, an associate with Jacobs Associates, San Francisco, was a key tunnel designer and worked closely with the construction team throughout excavation. "It was important to provide solutions to any issues that

arose during construction in 'real-time,'" he said. A native of Nepal, Thapa received a PhD in geotechnical engineering from the University of California, Berkeley.

Known in the construction office and in the field for his inimitable sense of humor, Axel Nitschke is all business when it comes to tunneling, providing invaluable technical expertise throughout excavation. Nitschke, who is a Senior Tunnel Engineer with Gall Zeidler Consultants of Virginia, has worked on several other significant tunneling projects in the United States, including the Beacon Hill Station Tunnel in Seattle, and Tysons Corner Tunnel near Washington DC.

Ivan, Bhaskar and Axel will all be missed, but their legacy on the Fourth Bore Project will "rock on."

FUNDING

The initial programmed funding for the Caldecott Fourth Bore Project was \$420 million, which includes the following four construction contracts: 1) Construction of the Caldecott Fourth Bore; 2) Realignment of the Westbound State Route 24 to Northbound State Route 13 ramp; 3) Kay Street Improvements and 4) Highway Planting, to be awarded in 2014. This programmed amount, comprised of federal, state and regional/local funds, covered the expenditures for environmental clearance, design, right-of-way and construction support, as well as payment to the four construction contractors.

Due to bid savings on the tunnel and ramp contracts, the California Transportation Commission (CTC) and the Federal Highway Administration (FHWA) de-obligated a portion of the Corridor Mobility Improvement Account (CMIA) and the American Recovery and Reinvestment Act (ARRA) funds, respectively. The revised programmed funding for the entire project is now \$402 million.

